

TFI Report 490226-02

Impact Sound Insulation

Customer

Mac Lean Products BV
Logistic Boulevard 3
4791 VC Klundert
NETHERLANDS

Product

LVT with floor underlay
Flooring LVT Vinyl 5,0 mm, 1,2 mm HDPE (blue) Underlay, PE-foil

This report includes 2 pages and 1 annex(es)

Responsible at TFI



-Senior Engineer-

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Aachen, 19.02.2019



Dr.-Ing. Bayram Aslan



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1 Transaction

Test order	impact sound insulation according to EN ISO 10140
Order date	26.09.2018
Your reference	-
Sampling performed by	Customer
Product designation	Flooring LVT Vinyl 5,0 mm, 1,2 mm HDPE (blue) Underlay, PE-foil
TFI sample number	19-02-0100, 19-02-0103, 19-02-0109

2 Product Specification

Thickness:	Construction: (from top to bottom)	TFI sample number:
5,0 mm*	Flooring LVT Vinyl 5,0 mm	19-02-0100
1,2 mm*	1,2 mm HDPE (blue) Underlay	19-02-0103
-	PE-foil	19-02-0109

* customer information

19-02-0100



19-02-0103



19-02-0109



3 Results

Construction with weights

Impact sound insulation $\Delta L_w = 22 \text{ dB}$ $\Delta L_{in} = 11 \text{ dB}$

Construction without weights

Impact sound insulation $\Delta L_w = 22 \text{ dB}$ $\Delta L_{in} = 11 \text{ dB}$

4 Annexes

Impact sound insulation TS 490226-02^a

The annexes marked ^a are based on tests accredited in accordance with EN ISO/IEC 17025.

Annex TS - Impact Sound Insulation

1 Transaction

Product designation	Flooring LVT Vinyl 5,0 mm, 1,2 mm HDPE (blue) Underlay, PE-foil
TFI sample number	19-02-0100, 19-02-0103, 19-02-0109
Testing period	12.02.2019

2 Test Method / Requirements

EN ISO 10140-1:2014	Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for certain products
EN ISO 10140-2:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation
EN ISO 10140-3:2015	Acoustics - Laboratory measurement of sound insulation of building elements - Part 3: Measurement of impact sound reduction
EN ISO 10140-4:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 4: Measurement procedures and requirements
EN ISO 10140-5:2014	Acoustics - Laboratory measurement of sound insulation of building elements - Part 5: Requirements for test facilities and equipment
EN ISO 717-1:2013	Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation
EN ISO 717-2:2013	Acoustics - Rating of sound insulation in buildings and of building elements - Part 2: Impact sound reduction
EN ISO 12999-1: 2014	Acoustics - Determination and application of measurement uncertainties in building acoustics - Part 1: Sound insulation

3 Remarks

None

4 Measuring Operation

Measurement of the impact sound pressure level:	Using 8 fixed microphone positions, with 1 tapping machine position for each microphone position (The single results of the one-third-octave-bands were averaged on an energy basis)
Test surface:	~ 10 m ²
Category:	II
Connection with the floor:	loose laid

Damage to the sample: None
 Corrections: None, since background noise corrections and airborne sound corrections are not relevant

5 Laboratories

Test rooms: Laboratories of the TFI Aachen GmbH, Hauptstrasse 133, 52477 Alsdorf, Germany
 Sending room (1.04): $V = 52.1 \text{ m}^3$ (with diffusers)
 Receiving room (0.01): $4.05 \text{ m} \times 3.95 \text{ m} \times 3.33 \text{ m} + 2.00 \text{ m} \times 0.98 \text{ m} \times 0.18 \text{ m}$; $V = 53.6 \text{ m}^3$ (cuboid room, with diffusers)
 Reference floor: $4.27 \text{ m} \times 4.46 \text{ m}$; $S = 19.04 \text{ m}^2$
 14 cm concrete slab floor with an area-related mass of $m' \sim 322 \text{ kg/m}^2$
 Flanking walls: Lime sand brick walls with light wall facings (facing shell $d = 12 \text{ cm}$) with an average area-related mass of $m' \sim 330 \text{ kg/m}^2$

6 Measuring Devices

Real time analyser: Norsonic Nor140, SN: 1406926
 Microphone: Norsonic Type 1209/21134
 Tapping machine: NORSONIC, Type 211, SN: 502
 (standard tapping machine with 3 feet and 5 hammers according to ISO 10140)

7 Evaluation

The impact sound pressure level generated by the standard tapping machine is measured in the receiving room under a bare heavy floor with and without a floor covering. The impact sound reduction is determined on the basis of the measured values as follows:

$$\Delta L = L_{n,0} - L_n \text{ (dB)}$$

$L_{n,0}$ Impact sound pressure level without a floor covering (dB)

L_n Impact sound pressure level with a floor covering (dB)

For the evaluation of the weighted reduction in impact sound pressure level ΔL_w , the relevant reference curve is shifted in increments of 1 dB towards the measured curve until the sum of unfavourable deviations is as large as possible, but not more than 32 dB.

The linear impact sound level ΔL_{lin} is determined according to the following equation:

$$\Delta L_{in} = L_{n,r,0,w} + C_{l,r,0} - (L_{n,r,w} + C_{l,r}) = \Delta L_w + C_{l,\Delta}$$

$L_{n,r,w}$	is the calculated weighted normalized impact sound pressure level of the reference floor with the floor covering under test
$L_{n,r,0,w}$	78 dB, calculated from $L_{n,r,0}$ according to Section 4.3.1 of DIN EN ISO 717-2: 2013
$C_{l,r}$	Spectrum adaptation term for the reference floor with the floor covering to be tested
$C_{l,r,0}$	-11 dB, spectrum adaptation term for the reference floor with $L_{n,r,0}$ determined according to Annex A, Section A.2.1 of DIN EN ISO 717-2:2013

8 Note

The results are based on measurements performed under laboratory conditions with artificial excitation (standard procedure). The test results are applicable in due consideration of the national provisions and the local circumstances and/or constructions.

Impact sound insulation according ISO 10140-1

TS 490226-02

Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight reference floor

Annex TS – Impact sound insulation

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TFI sample number: 19-02-0100, 19-02-0103, 19-02-0109 Testing period: 12.02.2019
 Product name: Flooring LVT Vinyl 5,0 mm, 1,2 mm HDPE (blue) Underlay, PE-foil

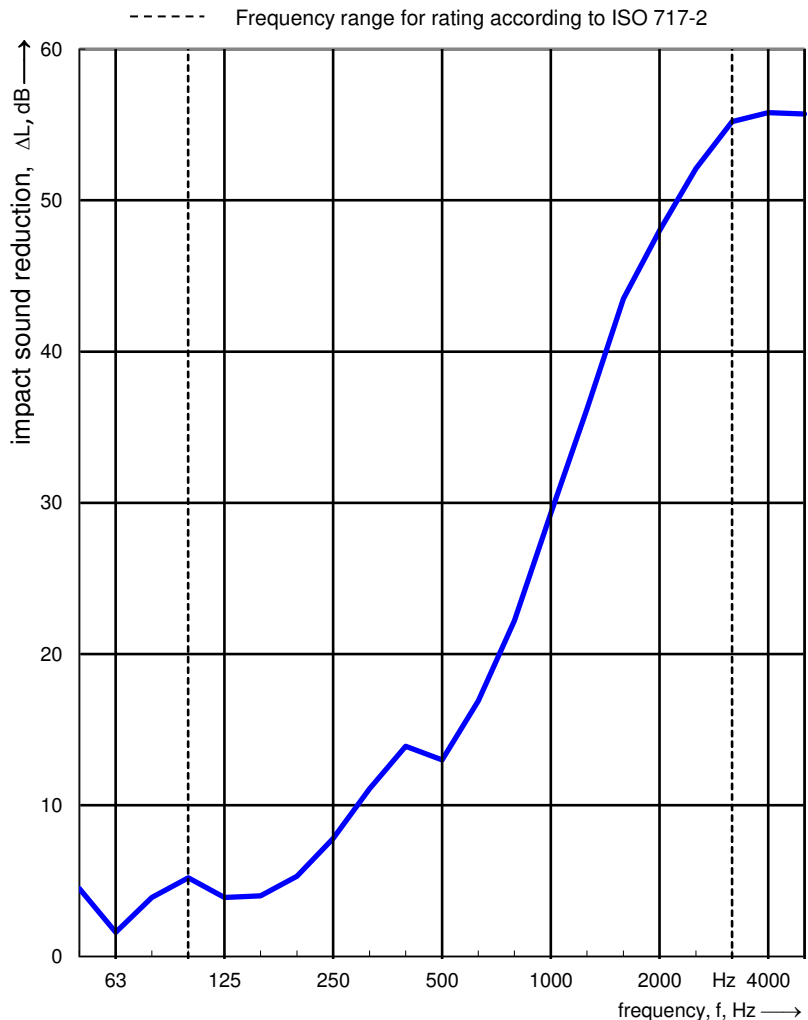
Installed by: client

Construction: Flooring LVT Vinyl 5,0 mm 19-02-0100 (with weights)
 (from top to bottom) 1,2 mm HDPE (blue) Underlay 19-02-0103
 PE-foil 19-02-0109

Receiving room:		Source room:	
Volume:	53,6 m ³	Volume:	52,1 m ³
Air temperature:	18,2 °C	Air temperature:	17,7 °C
Relative air humidity:	67,5 %	Relative air humidity:	39,5 %
Static pressure:	101,4 kPa	Type of reference floor:	Heavyweight

Frequency f [Hz]	L _{n,0} 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	58,9	4,5
63	61,2	1,6
80	58,1	3,9
100	59,6	5,2
125	64,8	3,9
160	61,1	4,0
200	61,4	5,3
250	64,5	7,8
315	64,4	11,1
400	63,7	13,9
500	64,1	13,0
630	64,6	16,9
800	65,1	22,2
1000	66,5	29,3
1250	67,1	36,2
1600	67,5	43,5
2000	67,8	48,0
2500	67,0	52,1
3150	67,6	55,2
4000	66,7	55,8
5000	63,4	55,7 ¹

¹ too high



Evaluation according to ISO 717-2

ΔL_w = 22 dB

C_{i,Δ} = -11 dB

C_{i,r} = 0 dB

ΔL_{lin} = 11 dB

The results are based on measurements, which were performed under laboratory conditions with artificial excitation (standard procedure).



Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight reference floor

Annex TS – Impact sound insulation

Page 2 of 2

Evaluation according to ISO 717-2

$$\Delta L_w = 22 \text{ dB}$$

$$C_{i,\Delta} = -11 \text{ dB}$$

$$C_{i,r} = 0 \text{ dB}$$

The results are based on measurements, which were performed under laboratory conditions with artificial excitation (standard procedure).

Weighted normalized impact sound pressure level $L_{n,0,w} = 73 \text{ dB}$

Weighted normalized impact sound pressure level $L_{n,w} = 50 \text{ dB}$

Weighted normalized impact sound pressure level $L_{n,r,w} = 56 \text{ dB}$

Frequency [Hz]	ΔL [dB]	$L_{n,0}$ [dB]	L_n [dB]	$L_{n,r}$ [dB]
50	4,5	58,9	54,4	
63	1,6	61,2	59,6	
80	3,9	58,1	54,2	
100	5,2	59,6	54,4	61,8
125	3,9	64,8	60,9	63,6
160	4,0	61,1	57,1	64,0
200	5,3	61,4	56,1	63,2
250	7,8	64,5	56,7	61,2
315	11,1	64,4	53,3	58,4
400	13,9	63,7	49,8	56,1
500	13,0	64,1	51,1	57,5
630	16,9	64,6	47,7	54,1
800	22,2	65,1	42,9	49,3
1000	29,3	66,5	37,2	42,7
1250	36,2	67,1	30,9	35,8
1600	43,5	67,5	24,0	28,5
2000	48,0	67,8	19,8	24,0
2500	52,1	67,0	14,9	19,9
3150	55,2	67,6	12,4	16,8
4000	55,8	66,7	10,9	
5000	55,7	63,4	7,7	

Receiving room:

Volume: 53,6 m³

Air temperature: 18,2 °C

Relative air humidity: 67,50 %

Static pressure: 101,4 kPa

Source room:

Volume: 52,1 m³

Air temperature: 17,7 °C

Relative air humidity: 39,5 %

Type of reference floor: Heavyweight



Impact sound insulation according ISO 10140-1

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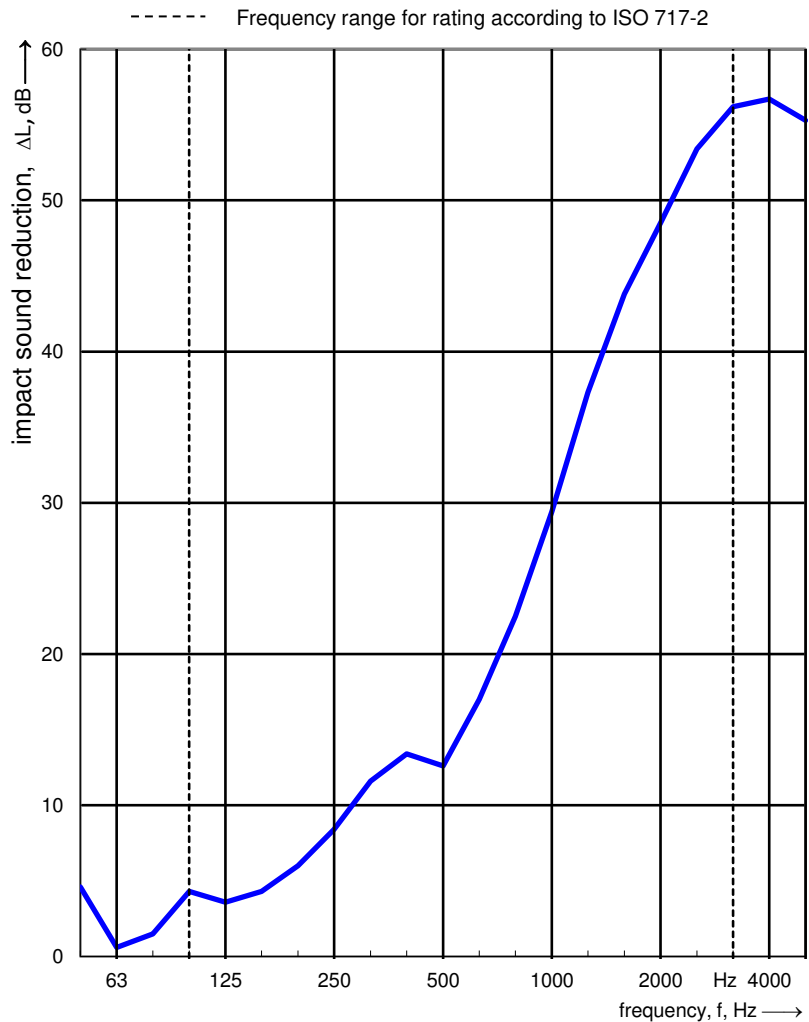
Installed by: client

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 (from top to bottom) 1,2 mm HDPE (blue) Underlay 19-02-0103
 PE-foil 19-02-0109

Receiving room:		Source room:	
Volume:	53,6 m ³	Volume:	52,1 m ³
Air temperature:	18,2 °C	Air temperature:	17,7 °C
Relative air humidity:	67,5 %	Relative air humidity:	39,5 %
Static pressure:	101,4 kPa	Type of reference floor:	Heavyweight

Frequency f [Hz]	L _{n,0} 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	58,9	4,6
63	61,2	0,6
80	58,1	1,5
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125	64,8	3,6
160	61,1	4,3
200	61,4	6,0
250	64,5	8,4
315	64,4	11,6
400	63,7	13,4
500	64,1	12,6
630	64,6	17,0
800	65,1	22,5
1000	66,5	29,4
1250	67,1	37,3
1600	67,5	43,8
2000	67,8	48,5
2500	67,0	53,4
3150	67,6	56,2
4000	66,7	56,7
5000	63,4	55,3 ¹

¹ too high



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Frequency [Hz]	ΔL [dB]	$L_{n,0}$ [dB]	L_n [dB]	$L_{n,r}$ [dB]
50	4,6	58,9	54,3	
63	0,6	61,2	60,6	
80	1,5	58,1	56,6	
100	4,3	59,6	55,3	62,7
125	3,6	64,8	61,2	63,9
160	4,3	61,1	56,8	63,7
200	6,0	61,4	55,4	62,5
250	8,4	64,5	56,1	60,6
315	11,6	64,4	52,8	57,9
400	13,4	63,7	50,3	56,6
500	12,6	64,1	51,5	57,9
630	17,0	64,6	47,6	54,0
800	22,5	65,1	42,6	49,0
1000	29,4	66,5	37,1	42,6
1250	37,3	67,1	29,8	34,7
1600	43,8	67,5	23,7	28,2
2000	48,5	67,8	19,3	23,5
2500	53,4	67,0	13,6	18,6
3150	56,2	67,6	11,4	15,8
4000	56,7	66,7	10,0	
5000	55,3	63,4	8,1	

Receiving room:

Volume: 53,6 m³

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